

Remarks

Claims 1-13, 15-34 and 39 are currently pending in the Application.

35 U.S.C. §102(a) rejection

Claims 1-7, 9-13, 15-16, 18-28, 30-34 and 39 stand rejected under 35 U.S.C. §102(a) as being anticipated by Waarts (U.S. Patent No. 6,411,323). Applicants respectfully disagree. Applicants submit that the Examiner has not shown that Waarts teaches each and every element as set forth in the rejected claims. In particular:

Claim 1

A. Applicants submit that Waarts does not disclose, suggest or teach, *inter alia*, the following features recited by Claim 1 of the present application:

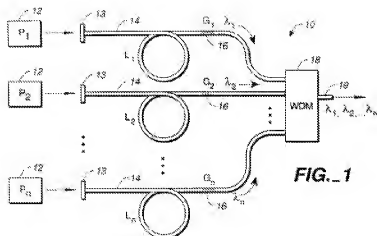
“pulling an intrinsic frequency distribution of the at least one other laser” (emphasis added)

The Examiner alleges that because Waarts device allegedly has the same configuration as presently claimed, Waarts’ device allegedly also has the same function and characteristics as presently claimed. What does the Examiner base his allegation on? The Examiner appears to rely on facts within his personal knowledge. Applicants respectfully request, under 37 C.F.R. § 1.104(d)(2), that the Examiner provide an Affidavit supporting the Examiner’s assertion that Waarts’ combiner inherently able to pull “an intrinsic frequency distribution of the at least one other laser” as recited in Claim 1. If the Examiner is relying on a prior art reference Applicants respectfully request that the Examiner cite the reference. Otherwise, Applicants respectfully request that the assertion be withdrawn and Claim 1 be allowed. Claims 2-12, at least based on their dependency on Claim 1, are also patentable over Waarts.

B. Applicants submit that the Examiner has not shown that Waarts discloses, suggests or teaches, *inter alia*, the following features recited by Claim 1 of the present application:

“configuring the coupling between the plurality of lasers so that each laser interacts with at least one other laser ... wherein the interactions between the lasers form a **coherent optical output**” (emphasis added)

Referring to Waarts' Figure 1 reproduced below, the Examiner asserts that the features of Claim 1 are disclosed by Waarts' system 10 (p. 2 of the Office Action). Applicants respectfully traverse the Examiner's assertion.



According to Waarts, system 10 has a multi-wavelength output 19 (c. 8, ll. 17-19 of Waarts). Contrary to Waarts, Claim 1 recites a “coherent optical output.”

As known in the art, waves are coherent if the crests of one wave are aligned with the crests of another wave and the troughs of the one wave are aligned with the troughs of another wave (see printout from ThinkQuest.org enclosed herein).

Applicants submit that $\lambda_1, \lambda_2 \dots \lambda_n$ of the output 19 would have to be equal to each other in order to have crests and troughs that align with each other. Because $\lambda_1, \lambda_2 \dots \lambda_n$ of the output 19 are not equal to each other, Waarts' multi-wavelength output 19 is not a “coherent optical output” as recited in Claim 1. Hence, Claim 1 is patentable over Waarts and should be allowed by the Examiner. Claims 2-12, at least based on their dependency on Claim 1, are also patentable over Waarts.

Claim 2

Applicants submit that the Examiner has not shown that Waarts discloses, suggests or teaches, *inter alia*, the following features recited by Claim 2 of the present application:

“wherein outputs of the plurality of lasers have relatively **equal phases**”
(emphasis added)

Applicants submit that the Examiner failed to comply with 37 C.F.R. §1.104(c)(2) by not designating “as nearly as practicable” where Waarts teaches that outputs of pump sources P1, P2 ... Pn have relatively “equal phases” as recited in Claim 2. Applicants request that the Examiner comply with 37 C.F.R. §1.104(c)(2) or withdraw his rejection.

Claim 3

Applicants submit that the Examiner has not shown that Waarts discloses, suggests or teaches, *inter alia*, the following features recited by Claim 3 of the present application:

“the plurality of lasers comprise a plurality of fiber lasers and **fiber couplers** are utilized to couple the optical outputs of the plurality of fiber lasers so that the plurality of fiber lasers form inphase states” (emphasis added)

Applicants submit that the Examiner failed to comply with 37 C.F.R. §1.104(c)(2) by not designating “as nearly as practicable” where Waarts discloses “fiber coupler” as recited in Claim 3. Applicants request that the Examiner comply with 37 C.F.R. §1.104(c)(2) or withdraw his rejection.

Claim 4

Applicants submit that the Examiner has not shown that Waarts discloses, suggests or teaches, *inter alia*, the following features recited by Claim 4 of the present application:

“disposing a **second** reflector to receive the coherent optical output”
(emphasis added)

Applicants submit that the Examiner failed to comply with 37 C.F.R. §1.104(c)(2) by not designating “as nearly as practicable” where Waarts discloses “a second reflector” as recited in Claim 4. Applicants request that the Examiner comply with 37 C.F.R. §1.104(c)(2) or withdraw his rejection.

Claim 10

Applicants submit that the Examiner has not shown that Waarts discloses, suggests or teaches, *inter alia*, the following features recited by Claim 10 of the present application:

“coupling together the plurality of fibers at a position proximate to the first end” (emphasis added)

Applicants submit that the Examiner failed to comply with 37 C.F.R. §1.104(c)(2) by not designating “as nearly as practicable” where Waarts’ fibers are coupled together. Applicants request that the Examiner comply with 37 C.F.R. §1.104(c)(2) or withdraw his rejection.

Claim 11

Applicants submit that the Examiner has not shown that Waarts discloses, suggests or teaches, *inter alia*, the following features recited by Claim 11 of the present application:

“coupling together pairs of fibers of the plurality of fibers at a position proximate to the first end” (emphasis added)

Applicants submit that the Examiner failed to comply with 37 C.F.R. §1.104(c)(2) by not designating “as nearly as practicable” where any of the Waarts’ fibers are coupled together. Applicants request that the Examiner comply with 37 C.F.R. §1.104(c)(2) or withdraw his rejection.

Claim 12

Applicants submit that the Examiner has not shown that Waarts discloses, suggests or teaches, *inter alia*, the following features recited by Claim 12 of the present application:

“wherein the lasers comprise fiber lasers having **lengths within 10%** of each other” (emphasis added)

The Examiner asserts that this feature is disclosed in Waarts’ col. 10, lines 20-29 (p. 2, last line of the Office Action). Applicants respectfully traverse the Examiner’s assertion.

In the passage cited by the Examiner, Waarts teaches that a laser fiber of 20 meters in length has a wavelength of 1092 nm, a laser fiber of 15 meters in length has a wavelength of 1090 nm, a laser fiber of 12.5 meters in length has a wavelength of 1087 nm, and a laser fiber of 10 meters in length has a wavelength of 1086 nm. Why does the Examiner believe that the length of the laser fibers are “within 10% of each other” as recited in Claim 12?

If one of the laser fibers has a length of 20 meters, another laser fiber should have a length of either 22 meters or 18 meters. Where does Waarts disclose a laser fiber of either 22 meters or 18 meters? If one of the laser fibers has a length of 15 meters, another laser fiber should have a length of either 16.5 meters or 13.5 meters. Where does Waarts disclose a laser fiber of either 16.5 meters or 13.5 meters? If one of the laser fibers has a length of 12.5 meters, another laser fiber should have a length of either 13.75 meters or 11.25 meters. Where does Waarts disclose a laser fiber of either 13.75 meters or 11.25 meters? Finally, if one of the laser fibers has a length of 10 meters, another laser fiber should have a length of either 11 meters or 9 meters. Where does Waarts disclose a laser fiber of either 11 meters or 9 meters?

Applicants submit that the Examiner failed to comply with 37 C.F.R. §1.104(c)(2) by not designating “as nearly as practicable” where lengths of Waarts’ fibers are “within 10% of each other” as recited in Claim 12. Applicants request that the Examiner comply with 37 C.F.R. §1.104(c)(2) or withdraw his rejection.

Claim 13

A. Applicants submit that, at least for the reasons stated above for Claim 1, Waarts does not teach, disclose or suggest “wherein said combiner is configured to couple the light directed from each fiber so that the light from one fiber interacts with at least one other fiber to **pull an intrinsic frequency distribution** of the light of the at least one other fiber” (emphasis added) as recited in Claim 13. Hence, Claim 13 is patentable over Waarts and should be allowed by the Examiner. Claims 14-22, at least based on their dependency on Claim 13, are also patentable over Waarts.

B. Applicants submit that the Examiner has not shown that Waarts discloses, suggests or teaches, *inter alia*, the following features recited by Claim 13 of the present application:

“wherein said combiner comprises: a **first coupler** coupling each of the plurality of optical fibers; and a **second reflector** for receiving light from an output of the coupler and transmitting the optical output from the combiner” (emphasis added)

Referring to Waarts’ Figure 1 reproduced above, the Examiner asserts that the “combiner” as recited Claim 13 is disclosed by Waarts’ WDM 18 (p. 2 of the Office Action). Applicants respectfully traverse the Examiner’s assertion.

Applicants submit that the Examiner failed to comply with 37 C.F.R. §1.104(c)(2) by not designating “as nearly as practicable” where Waarts’ WDM 18 comprises “a first coupler” and “a second reflector” as recited in Claim 13. Applicants request that the Examiner comply with 37 C.F.R. §1.104(c)(2) or withdraw his rejection.

Claims 14-22, at least based on their dependency on Claim 13, are also patentable over Waarts.

Claim 15

Applicants submit that the Examiner has not shown that Waarts discloses, suggests or teaches, *inter alia*, the following features recited by Claim 15 of the present application:

“wherein pairs of the plurality of optical fibers are coupled at **second couplers** disposed between the reflector and the laser active region of each of the plurality of optical fibers” (emphasis added)

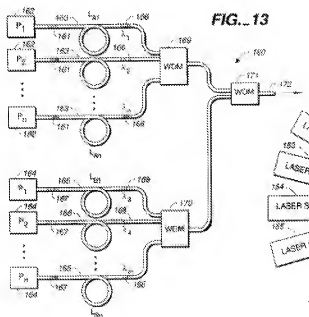
Applicants submit that the Examiner failed to comply with 37 C.F.R. §1.104(c)(2) by not designating “as nearly as practicable” where pairs of optical fibers are coupled at “second couplers” as recited in Claim 15. Applicants request that the Examiner comply with 37 C.F.R. §1.104(c)(2) or withdraw his rejection.

Claim 16

Applicants submit that the Examiner has not shown that Waarts discloses, suggests or teaches, *inter alia*, the following features recited by Claim 16 of the present application:

“wherein the plurality of optical fibers are coupled at a **second coupler disposed between the first reflector and the laser active region** of each of the plurality of optical fibers” (emphasis added)

Referring to Waarts' Figure 13 reproduced below, the Examiner asserts that the “second coupler” as recited Claim 16 is disclosed by Waarts' WDM 171 (p. 3 of the Office Action). Applicants respectfully traverse the Examiner's assertion.



Applicants submit that Waarts' WDM 171 does not teach, disclose or suggest the "second coupler" as recited Claim 16, because, Waarts' WDM 171 is not disposed "between the first reflector and the laser active region" as recited in Claim 16. If the Examiner does not agree, the Examiner is requested to comply with 37 C.F.R. §1.104(c)(2) by designating "as nearly as practicable" where Waarts discloses a "first reflector" and "the laser active region" as recited in Claim 16. Otherwise, Applicants request that the Examiner withdraw his rejection.

Claim 22

Applicants submit that the Examiner has not shown that Waarts discloses, suggests or teaches, *inter alia*, the following features recited by Claim 22 of the present application:

"wherein the optical fibers are coupled in a **different patterns** in the first coupler and the second coupler" (emphasis added)

Applicants submit that the Examiner failed to comply with 37 C.F.R. §1.104(c)(2) by not designating "as nearly as practicable" where pairs of optical fibers are coupled in a "different patterns" as recited in Claim 22. Applicants request that the Examiner comply with 37 C.F.R. §1.104(c)(2) or withdraw his rejection.

Claim 23

Applicants submit that, at least for the reasons stated above for Claim 1, Waarts does not teach, disclose or suggest "means for **pulling an intrinsic frequency distribution** of the laser devices to form a **coherent optical output**" (emphasis added) as recited in Claim 23. Hence, Claim 23 is patentable over Waarts and should be allowed by the Examiner. Claims 24-34, at least based on their dependency on Claim 23, are also patentable over Waarts.

Claim 39

A. Applicants submit that, at least for the reasons stated above for Claim 1, Waarts does not teach, disclose or suggest "wherein said combiner is configured to couple the light directed from each fiber so that the light from one fiber interacts with at least one other

fiber to **pull an intrinsic frequency distribution** of the light of the at least one other fiber” (emphasis added) as recited in Claim 39. Hence, Claim 39 is patentable over Waarts and should be allowed by the Examiner.

B. Applicants submit that, at least for the reasons stated above for Claim 12, Waarts does not teach, disclose or suggest “wherein the optical fibers have lengths **within 10%** of each other” (emphasis added) as recited in Claim 39. Hence, Claim 39 is patentable over Waarts and should be allowed by the Examiner.

Conclusion

In view of the above, reconsideration and allowance of all the claims are respectfully solicited.

The Commissioner is authorized to charge any additional fees which may be required or credit overpayment to deposit account no. 12-0415. In particular, if this response is not timely filed, then the Commissioner is authorized to treat this response as including a petition to extend the time period pursuant to 37 CFR 1.136 (a) requesting an extension of time of the number of months necessary to make this response timely filed and the petition fee due in connection therewith may be charged to deposit account no. 12-0415.

I hereby certify that this document is being transmitted to the Patent and Trademark Office via electronic filing.

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Respectfully submitted,

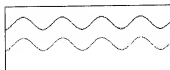
/Alexander Krayner 60,854/

Alexander Krayner
Attorney for Applicants
Reg. No. 60,854
LADAS & PARRY LLP
5670 Wilshire Boulevard, Suite 2100
Los Angeles, California 90036
(323) 934-2300

Coherent light

Coherent light are light waves that are "in phase" with one another.

For example, two waves are coherent if the crests of one wave are aligned with the crests of the other and the troughs of one wave are aligned with the troughs of the other. Otherwise, these lightwaves are considered incoherent.



[Two coherent waves]

Light produced by lasers are coherent light. Light from light bulbs or the sun, however, are incoherent light.

See also:

[Holograms](#)

[Lasers](#)

[Interference](#)

[Light Bulbs and Fires](#)

[TV and Florescent Light](#)

[The Sun](#)